Percent Tree Cover Along Walkable Roads

This EnviroAtlas community map estimates the percentage of tree cover within an estimated pedestrian area alongside walkable roads.

Why is tree cover along walkable roads important?

Tree cover provides many services, including air and water filtration, carbon storage, natural hazard mitigation, and pleasing settings that encourage people to spend time outdoors. Street trees in particular can reduce noise, buffer pedestrians from traffic, and cool summer temperatures, making these frequently traveled spaces more hospitable. There are many health benefits that can be gained from the natural services that trees provide; examples from scientific studies show trees improve mental health, promote physical activity, encourage social interaction, and protect against heat related illness and ultraviolet light.

Street trees provide access to the natural environment while individuals go about their daily lives. Trees on walkable roads increase the aesthetic value, comfort, and safety of walking outdoors. In urban centers, people frequent parks and tree-lined districts to socialize, recreate, and engage with nature. Spending time in these settings has been shown to decrease stress, depression, and feelings of hostility.

Tree-lined streets offer a reprieve from extreme summer day and nighttime temperatures through evapotranspiration and shading. This cooling effect increases with the amount of woody vegetation. During heat events, tree cover can significantly reduce local ambient air temperatures, helping to reduce stress, hospital admissions, and mortality associated with extreme heat.

Tree cover further serves communities by filtering and absorbing water that flows off of impervious surfaces like roads and parking lots. Tree cover helps to regulate the flow of water through a watershed by intercepting, absorbing, and slowly releasing water. This “sponge” effect can reduce negative impacts of stormwater runoff. The lack of significant tree cover and other vegetation in and around populated areas can result in more frequent and/or severe flooding, potentially resulting in adverse health effects associated with these events.

Photo by Eric Vance, U.S. EPA

How can I use this information?

The map, Percent Tree Cover along Walkable Roads, can be used to assess green infrastructure across city blocks and neighborhoods. This map can be combined with intersection density to estimate areas that may be more or less conducive to walking. Demographic layers can be added to assess disproportionate access to health boosting tree-lined roads. Communities can also use these data to identify locations for tree planting or conservation efforts. Comparing areas of low street tree cover with flood and heat maps can support these community decisions. Finally, the data may be downloaded for communities, decision-makers, and researchers to combine with their own data for a variety of purposes.

How were the data for this map created?

This map is based on the land cover data derived for each EnviroAtlas community, and NAVTEQ road centerlines and attributes. The land cover data were classified to one-meter resolution from aerial photography and supplemental data through remote-sensing methods. Classified land cover that was considered tree cover included trees and forests, orchards, and woody wetlands. Only NAVTEQ roads with a speed limit less than 55 miles per hour were included to isolate potentially walkable streets. Road width was estimated based on the given or calculated number of lanes. The estimated sidewalk area was determined to lie within 7.5 meters of the road edge. One meter of overlap with the road was added to account for variabilities in the centerline placement and in the actual road width, leading to a focus area width of 8.5 meters on each side of the road (Figure 1).

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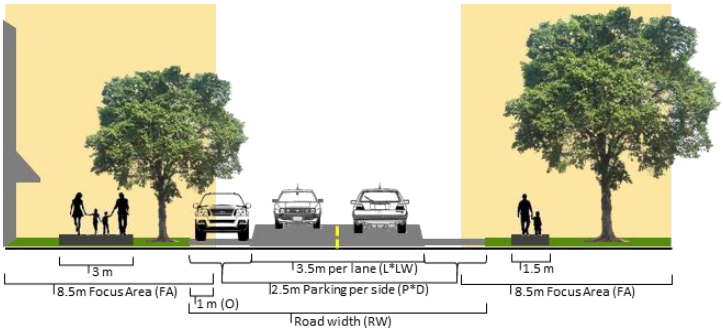

Figure 1. Illustration of the estimated focus area (FA, yellow) given the number of lanes (L), estimated lane widths (LW), parking space (parking lane width multiplied by the number of directions of travel; P*D), and a one meter overlap (O) on each side of the road.

Following estimation of this focus area, the area was intersected with tree cover from the 1-meter land cover data. Percent tree cover for each city block (the distance between intersections) was then determined.

What are the limitations of these data?

All of the EnviroAtlas community maps that are based on land cover use remotely-sensed data. Remotely-sensed data in EnviroAtlas have been derived from imagery and have not been verified. These data are estimates and are inherently imperfect. A general definition was used to screen for walkable roads (speed limit <55 miles per hour). However, it is possible that not all of the included roads have conducive or safe walkways. Actual walkability is a factor of many aspects of the environment such as sidewalks, connectivity, and land use.

Finally, this metric relies on the accurate estimation of the potential sidewalk area. If present, the sidewalk may fall outside the focus area due to inaccurate data for the road centerline or width, or to unusual sidewalk placement. Metric validation was performed in three communities; accuracy, defined as at least 50% of the focus area mapped in the correct place, ranged from 83% to 89% depending on the community.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. The EnviroAtlas land cover maps created for each community are available under the Supplemental Maps tab in the interactive map.

Where can I get more information?

Numerous resources are available on the relationships between tree cover, ecosystem services, and human health and well-being; a small selection of these is below. In-depth information on the relationships between urban tree cover and human health and well-being can be found in EPA's Eco-Health Relationship Browser. For additional information on how the data were created or their limitations, access the metadata for the data layer. To ask specific questions about these data, contact the EnviroAtlas Team.

Acknowledgments

EnviroAtlas is a collaborative effort led by EPA. The analysis for this metric was conducted by Leah Yngve. The fact sheet was written by Leah Yngve, ASPPH/EPA Fellowship Program Participant, Jessica Daniel, EPA ORISE Research Participant, and Laura Jackson, EPA.

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